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RUSSIAN SURGICAL STAPLERS

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Public Health Service. Washington, 1961

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Compiled by STANLEY JABLONSKI

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Preface

As a part of the program for the improvement of medical technology and services in the Soviet Union, the Council of Ministers of the USSR established in September of 1951 the Scientific Research Institute of Experimental Surgical Apparatus and Instruments (NIIEKHiI) under the Ministry of Health of the USSR. The purpose of this Institute was to conduct research on the development and production of surgical instruments and to introduce new developments into surgical practice.

One of the chief tasks of the new Institute was the development of technics and apparatus for automatic or semi-automatic suturing and ligation of organs thus simplifying surgical procedures and lowering the requirements for manual dexterity in surgery. In accordance with these tasks, the Institute established the following requirements for the apparatus: simplicity of construction, rapidity of application, dependability, and non-traumatic sutures and ligations. The first instrument to meet these specifications was Gudov's vascular stapler capable of suturing mechanically the cuffed ends of severed vessels by means of tantalum staples. Success with Gudov's apparatus precipitated, in turn, the development of a whole new family of surgical suturing devices, including pulmonary stump staplers, gastric stump staplers, nerve staplers, and a variety of mono- and multi-staple specialized instruments for suturing and ligating different types of tissues.

According to Russian sources, it appears that the developers of the suturing apparatus were successful in meeting their goals. With the aid of a stapler it is now possible to restore blood flow in injured vessels in a fraction of the time required previously; to apply cavo-pulmonary anastomosis within three to five minutes and porto-pulmonary anastomosis within twelve minutes; to excise the stomach and suture the stump in less than five minutes; to excise the lung and suture the stump in less than five minutes; and to suture the atrium in commissurotomy in about one or two minutes. In addition, surgical staplers make it possible to apply relatively non-traumatic and completely non-reactogenic sutures which are stronger and more dependable than sutures applied by other methods. Histological, roentgenological, and physiological investigations performed under experimental as well as clinical conditions reveal the absence of any abnormal functional or histopathological reactions and only minor mechanical injuries after tantalum stapling. Some localized reactions originally attributed to the presence of tantalum were later linked to impurities, and most injuries blamed on the bulkiness of earlier instruments were eliminated by redesigning. The comparative incidence of complications after conventional and mechanical suturing also favors tantalum staplers. Somewhat less promising were the experiences with stainless steel staples. Although soft tissue responses to tantalum and to some steel alloys were quite similar, steel was considered as being responsible for pathological reactions of the osseous tissue.

Also in the field of simplifying complex surgical procedures, the developers of surgical staplers appear to have met all their objectives. The neurorrhaphic apparatus, for instance, makes it possible for a surgeon to perform a difficult operation of repairing a severed nerve rapidly and without any assistance. Even major operations, such as pneumonectomy and gastrectomy, were simplified by the availability of surgical staplers.

Thanks to their versatility and ability to apply sutures rapidly and surely, even in the most difficult conditions, staplers are currently being used in many fields of Soviet experimental surgery. Many of the recently publicized Russian achievements with whole-organ transplantation were made possible by surgical staplers. In the field of clinical medicine staplers made possible some operations which would not have been performed with conventional methods. Staplers are also responsible for increasing the margin of safety in certain operations, such as some types of cardiovascular surgery where the time factor is of the essence, and for bringing into the realm of possibility the therapy of certain otherwise inoperable conditions, such as pancreatic cancer. There are, however, some negative aspects of instrumental suturing of organs. Failure and break-down of instruments still seems to be uncommonly high and some types of apparatus are much more complex than originally anticipated.

A number of items listed were obtained from the 1957, 1958 and 1959 issues of Novye Khirurgicheskie Apparaty i Instrumenty i Opyt Ikh Primeneniia (Moskva, Nauchno-Issledovatel'skii Institut Eksperimental'noi Khirurgicheskoi Apparatury i Instrumentov). An English translation of the 1957 issue, entitled New Soviet Apparatus and Instruments, was produced in 1961 under a grant from the Russian Translation Program of the National Institutes of Health, U. S. Public Health Service to the Pergamon Institute.

The purpose of this bibliography is to focus attention on new and interesting developments in the field of surgical technics without attempting to evaluate the relative merit of these developments.

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Index of Apparatus

The numbers listed below refer to the item number.

Glossary

AI-625 APPARAT 0.15 APPARAT 0.25 APPARAT 0.4 AS-1 ASTS BS-1 BS-1-00 BS-1-007	types of single-staple and multi-purpose apparatus
KPA	(apparat dlia nalozheniia kava-pul'monal'nogo anastomoza) apparatus for the application of cavo-pulmonary anastomosis
OAB	(odnoskrepochnyi apparat dlia sshivaniia miagkikh tkanei) single-staple apparatus for suturing soft tissues
SGR	(sshivatel' grudiny i reber) apparatus for suturing the ribs and sternum
SMSH	(apparat dlia nalozheniia serozno-myshechnykh shvov) apparatus for the application of sero-muscular sutures
UAP	(apparat dlia ushivaniia arterial'nogo protoka) apparatus for suturing the ductus arteriosus
UKB	(apparat dlia ushivaniia kul'ti bronkha) apparatus for suturing the bronchial stump
UKL	(apparat dlia ushivaniia kornia legkogo) apparatus for suturing the radix pulmonis
UKZH	(apparat dlia ushivaniia kul'ti zheludka) apparatus for suturing the gastric stump
ULAV	(apparat dlia ushivaniia legochnykh arterii i ven) apparatus for suturing pulmonary arteries and veins

NOTE

Items marked * are in process of translation and publication under the provisions of Public Law 480; items marked ** are already available. Further information can be obtained from Technical Translations, published by the Office of Technical Services, Department of Commerce, Washington 25, D.C., or from the National Library of Medicine, Washington 25, D.C.

RUSSIAN SURGICAL STAPLERS

BILIARY SURGERY

see also: 87, 112.

1. **ANDROSOV P I, BABKIN S I, BELIAKOV P D, KLEMINA E P, KRIUCHKOVA G S: Apparat dlia mekhanicheskoi pereviazki sosudov [Apparatus for mechanical ligation of the blood vessels] Nov Khir Appar, No. 1:86-7, 1957. Illus.

The apparatus consists of a shaft with a hooked end which houses the matrix, a stapling magazine sliding along the shaft toward the matrix and a plunger mechanism pushing the magazine and activating the stapling mechanism. Tantalum-niobium staples are used. The apparatus was used without a single accident in various surgical procedures, including 37 ligations of the cystic duct in cholecystectomy.

2. GARIN N D, GRITSMAN IU IA, TANICH L F: Mekhanicheskaia pereviazka puzyrnogo protoka pri kholetsistektomii [Mechanical ligation of the cystic duct in cholecystectomy] Eksp Khir, 2(6):21-4, 1957. Illus.

The ULAV-5, a small model of a pulmonary vascular stapler, consists of a shaft with a hooked end housing the matrix, a stapling device sliding along the shaft and a plunger mechanism activating the stapler. The bile duct is ligated with two staples after being compressed between the matrix and the stapler by pressure applied to the plunger. The apparatus was used in three cholecystectomies.

CARDIOVASCULAR SURGERY

see also: 57, 73, 87, 112, 114, 117, 125, 126, 134.

3. ANAKHASIAN V R, TULIAKOVA L S: Tsirkuliarnyi mekhanicheskii shov pravoi podvzdoshnoi arterii, ranennoi i pereviazannoi pri gryzhesechenii [Circular mechanical suturing of the right iliac artery injured and ligated during kelotomy] Khirurgiia, 34(8):126-8, 1958.

While operating on a patient with a hernia, the surgeon accidently injured the right iliac artery with a needle. The injured artery was ligated immediately with silk. Four hours later permanent suturing was performed with a tantalum stapler.

4. ANAN'EV M G, PETROV N P: Sovremennoe tekhnicheskoe osnashchenie sosudistoi khirurgii i perspektivy ego razvitiia [Modern mechanical equipment for vascular surgery and perspectives for its development] Khirurgiia, No.11:99-104, 1957. Illus.

The original angiorrhaphic stapler was developed by Gudov. This instrument was later improved thus making it adaptable for vessels of different diameters, termino-lateral angiorrhaphy and epineural neurorrhaphy. Among some 200 types of surgical instruments currently available are several one-staple devices such as ULAV and a similar apparatus for mesenteric vessels.

5. ANDROSOV P I: Blood supply of mobilized intestine used for an artificial esophagus. AMA Arch Surg, 73:917-26, 1956.

Tantalum staplers were used in the anastomosis of the internal mammary artery and the mesenteric vessels of the mobilized intestine in 11 cases of entero-esophagoplasty.

6. ANDROSOV P I: Khirugicheskoe lechenie ostroi arterial'noi neprokhodimosti, vyzvannoi emboliei, s primeneniem mekhanicheskogo shva i izmeneniem metodiki operatsii [Surgical therapy of acute arterial obliteration caused by embolism with the aid of a mechanical suturing and a modified surgical method] Nov Khir Arkh, No. 3:36-41, 1958.

Four cases of embolism were operated on with the aid of vascular tantalum staplers.

7. ANDROSOV P I: Khirurgicheskoe lechenie travmaticheskikh anevrizm pri pomoshchi sosudosshivaiushchego apparata Gudova [Surgical therapy of traumatic aneurysms with the aid of Gudov's angiorrhaphic apparatus] Voennomed Zh, No. 11, 1951.

Not seen.

8. ANDROSOV P I: Mekhanicheskii shov pri ranenii krovenosnykh sosudov [Mechanical suture in vascular injuries] Voennomed Zh, No. 2, 1954.

Not seen.

9. ANDROSOV P I: Mekhanicheskii shov pri khirurgicheskom lechenii ranenii krovenosnykh sosudov i travmaticheskikh anevrizm [Mechanical suture in surgical therapy of vascular wounds and traumatic aneurysms] Vestn Khir Grekov, 73(3):37-46, 1955. Illus.

Gudov's apparatus consists of separate stapling and matrix halves. Each half is fitted individually on the injured vessel. After clamping, the ends of the severed vessel are placed in the half-sleeves and inverted. Staples, pushed from the half-sleeves of the stapling half, penetrate the cuffs longitudinally at the point of contact and are bent against the matrix without entering into the lumen of the sutured vessel. The apparatus was used sucessfully in numerous cases of vascular surgery. Spectacular results were obtained in a case of arm avulsion where the patient was able to recover good use of the hand.

10. ANDROSOV P I: Mekhanicheskii shov v khirurgii sosudov [Mechanical suturing in vascular surgery] Moscow, Medgiz, 1960. 130 p. Illus.

Contents: History of the development of vascular suturing and characteristics of the new method. Evaluation of mechanical vascular suturing in experimental conditions. Use of vascular suturing in clinical practice. Mechanical suturing of wounds of the bloood vessels. Mechanical suturing in the treatment of acute arterial obstruction caused by embolism. Use of mechanical vascular suturing in esophagoplasty. Use of the anastomosis between the right gastro-epiploic and the mesenteric vessels in a mobilized intestine. Use of mechanical suturing in the treatment of portal hypertension.

11. ANDROSOV P I: New method of surgical treatment of blood vessel lesions. AMA Arch Surg, 73:902-10, 1956. Illus.

In 1946-50 Gudov developed an apparatus for joining the cuffed ends of severed vessels. The apparatus has two hemostatic clamps, a clipping mechanism and a support. The mobilized ends of the injured vessel are clamped, fastened and inverted over the bushings. The vessel is then sutured by tantalum staples driven from semi-bushings, through both vascular walls, and against the support. The author was able to restore function in a case of an almost completely amputated forearm and in a case of arteriovenous aneurysm of the thigh.

12. **ANDROSOV P I: Novoe v sosudistoi khirurgi [Recent achievements in vascular surgery] Nov Khir Appar, No. 1:81-95, 1957. Illus.

Instrumental angiorrhaphy, as originated by Gudov, consists of cuffing the resected ends of the blood vessel followed by longitudinal stapling with tantalum clips pushed from the inside of the flexure of the cuff and penetrating through the point of contact and into the flexure of the opposite cuff without entering into the lumen of the anastomosed vessel. The AI-625, an improved version of this intrument, was used in various vascular diseases, including injuries, portal hypertension, aneurysms and embolisms. The apparatus was also used in establishing the supplementary circulation of a mobilized intestine during the formation of an artificial esophagus.

13. ANDROSOV P I: Operations in cases of aneurysms. Restoration of continuity of arteries by means of grafts without isolating the aneurysmic sac. AMA Arch Surg, 73:911-6, 1956.

Tantalum staplers were used in brachial and iliac arterial aneurysms caused by gunshot injuries and in arteriovenous subclavian aneurysms.

14. ANDROSOV P I: Opyt operativnogo lecheniia travmaticheskikh anevrizm s primeneniem mekhanicheskogo shva sosudosshivaiushchim apparatom [Results of surgical therapy in traumatic aneurysms with an apparatus for mechanical angiorrhaphy] Khirurgiia, No. 9:62-6, 1954.

The apparatus for joining the cuffed ends of a severed vessel with tantalum staples was used in the treatment of 22 arteriovenous and arterial aneurysms.

15. ANDROSOV P I: Peresadka veny v defekt arterii pri pomoshchi sosudosshivaiushchego apparata [Venous implants into arterial defects with the aid of the angiorrhaphic apparatus] Voennomed Zh, No. 2:25-30, 1955.

The hemostatic clamp of the stapling half of the apparatus is placed near the central end of the injured artery and Hepfner's clamp is applied distally. The venous graft is fitted in the supporting half of the apparatus. The graft is anastomosed to the artery when the halves of the apparatus are approximated. The procedure is repeated again in suturing the distal end of the artery to the other end of the graft. This technic was used in four cases of external iliac thrombosis, femoral and brachial artery injuries and traumatic femoral aneurysms.

16. ANDROSOV P I: Prodol'ny shov krovenosnykh sosudov, nalozhennyi sosudosshivaiushchim apparatom [Longitudinal sutures of blood vessels applied with the angiorrhaphic apparatus] Voennomed Zh, No. 11, 1954.

Not seen.

17. ANDROSOV P I, SHEINBERG S I: Usovershenstvovannyi sosudosshivaiushchii apparat i ego eksperimental'no-klinicheskoe primenenie [A simplified angiorrhaphic apparatus and its experimental and clinical use] Khirurgiia, No. 1:117-22, 1957. Illus.

The AI-625, originally developed in 1951 in the Krasnogvardeets factory, was further improved in 1955. The new model is capable of suturing blood vessels from 3 to 8 mm in diameter. The separate halves of the apparatus--the stapler and the matrix--are clamped individually on the severed ends of the blood vessel. The vessel is stapled after its ends are cuffed and aligned. After experimental studies, the AI-625 was used clinically in arterial and arteriovenous aneurysms.

18. BAKULEV A N, KOLESNIKOV S A, BUKHARIN V A, ZUBAREV R P: Pervyi opyt klinicheskogo primeneniia bol'shogo sosudoshivaiushchego apparata dlia nalozheniia kavapul'monal'nogo anastomoza pri tetrade Fallo [Preliminary results after the clinical use of a large angiorrhaphic apparatus for cavo-pulmonary anastomosis in Fallot's tetralogy] Grudn Khir, 2(2):3-6, 1960.

The apparatus was used in 12 cases of cavo-pulmonary anastomosis. In seven cases the suture was effective: in two cases there were extravasations, and in two cases additional sutures were required. The time of ligation of the vena cava was reduced from thirteen to three minutes. There was one fatality (attributed to an overdosage of anticoagulants) as compared with 13 fatalities in 42 cases of similar surgery performed without the aid of the apparatus.

19. BAZILEVSKAIA IU V: Mekhanicheskii shov i autoplastika pri svezhikh raneniiakh sosudov [Mechanical suturing and autoplasty in fresh vascular injuries] Leningrad, 1956.

Not seen.

20. BAZILEVSKAIA Z V, BAZIEVSKAIA IU V: Klinicheskoe primenenie apparata dlia mekhanicheskogo skrepochnogo sosudistogo shva [Clinical application of the apparatus for mechanical stapling of the blood vessels] Tr. 1-i Nauch. Sessii NIIEKHAI, Moscow, 1956.

Not seen.

21. **BAZILEVSKAIA Z V, BAZILEVSKAIA IU V: Opyt primeneniia apparata dlia mekhanicheskogo skobochnogo sosudistogo shva v eksperimente i klinike [Experience with the application of the angiorrhaphic stapler in experimental and clinical conditions] Nov Khir Appar, No. 1:110-5, 1957.

Experimental and clinical experiences indicate that tantalum staplers simplify vascular suturing, that sutures can be applied shortly after injuries, that patency of the vessel can be restored even in the presence of gangrene, and that grafting can be performed on inflamed vessels.

22. **BOGOMOLOVA O R: Morfologicheskie dannye po primeneniiu mekhanicheskogo sosudistogo shva v eksperimente [Morphological data on mechanical angiorrhaphy in experimental conditions] Nov Khir Appar, No. 1:103-9, 1957.

After stapling, the vascular intima proliferates and a bridge, composed at first of endothelial fibroblasts and collagen fibers and later of elastic fibers, begins to form. The structure of this bridge differs from that of a deep cicatrix and its presence does not interfere with the blood flow. Reactions to tantalum are usually absent, but, when present, they are manifested by a concentration of round cells.

23. BOGOMOLOVA O R, SAVCHENKO E D: Patomorfologicheskie izmeneniia v autoperesazhennoi konechnosti [Pathomorphological changes in the auto-transplanted extremity] Khirurgiia, No. 9:30-4, 1956.

Histological studies revealed the development of connective tissue bridges between the stapled vessel and the fusion of cuffs with the surrounding tissue. Mechanical injuries due to stapling were relatively minor and infiltrations around the staples were attributed to impurities rather than to the tantalum.

24. BUSALOV A A, MIKAELIAN A L: Mekhanicheskii shov levogo ushka serdtsa [Mechanical suturing of the left auricle of the heart] Khirurgiia, No. 8:16-22, 1955. Illus.

Excellent results were obtained in the treatment of mitral stenosis with two-row sutures applied with a one-staple apparatus on the left auricle. Even better results were achieved with the BS-1-007, an apparatus for stapling the radix pulmonis. About one to two minutes were required for the operation.

25. GESELEVICH A M, GORKIN N S, SMIRNOV B A: Apparat dlia mekhanicheskogo shva arterial'nogo (botallova) protoka i ego primenenie v eksperimente [Apparatus for the mechanical suturing of the ductus arteriosus (Botallo's) and its experimental use] Grudn Khir, 1(1):114-8, 1959.

The UAP-20 consists of a shaft with a hook housing the matrix on one end, a magazine housing the stapling mechanism sliding along the shaft, and a nut regulating the distance between the matrix and the stapler on the other end. It is capable of applying a two-row suture up to 20 mm in length. Observations made in dogs two to 130 days after the operation revealed that all sutures of the aorta and other large vessels were effective.

26. GESELEVICH A M, MIKAELIAN A L, STREKOPYTOV A A: Apparat dlia mekhanicheskogo shva ushka serdtsa [Apparatus for the mechanical suturing of the cardiac auricle] Khirurgiia, 33(8):123-6, 1957. Illus.

The UUS-23, a modified version of the UKB-25 and the UKB-16, was developed for two-row 16-staple suturing of the cardiac auricle up to 35 mm in length in the surgery of mitral stenosis. The apparatus consists of a shaft with a hook housing the matrix, the magazine housing the stapling mechanism sliding along the shaft, a nut for regulating the distance between the magazine and the matrix, and grip-handles for activating the stapling mechanism.

27. GUDOV V F: Metodika nalozheniia sosudistogo shva mekhanicheskim sposobom [A method for the application of vascular sutures by mechanical means] Khirurgiia, No. 12:58-60, 1950. Illus.

In 1946 the author and his associates developed an original apparatus for suturing the cuffed ends of severed vessels end-to-end by means of tantalum staples. The apparatus consists of two parts which are applied individually on the severed ends which are then cuffed over the sleeves. Tantalum staples are extruded from the magazine housed in half-sleeves located inside the flexure of one of the cuffs, and after penetrating through the point of contact of the aligned ends, are bent against the matrix housed in half-sleeves located inside the flexure of the opposite cuff.

28. GUDOV V F: Novyi sposob soedineniia krovenosnykh sosudov [A new method for joining the blood vessels] Moscow, Medgiz, 1951. 31 p. Illus. Also German translation: Neue Methode zur mechanischen Vereinigung der Blutgefasse. Berlin, Verl. Volk. Gesundh., 1955. 32 p.

Contents: The existing methods for the application of vascular sutures. Mechanical vascular sutures. The process of mechanical suturing of blood vessels. Construction of the apparatus for the application of circular vascular sutures. Dismantling and assembling. The magazine. Loading the instrument with staples. The roller. A device for controlling the thickness of the vascular wall. One-staple multi-cartridge device. Working of the one-staple device. Stages of vascular surgery. Advantages of the new method.

29. KOVANOV V V: Mechanical hand suture of blood vessels. Brit Med J, 1956, May 5, p. 1003-5.

The apparatus developed in the Soviet Union during 1945-50 operates on the following principle: the ends of the blood vessel are isolated and clamped and cuffs are formed by inverting the ends. The uniting and supporting halves are placed respectively on the distal and proximal ends of the vessel. After approximating the halves, suturing is performed by pushing the lever, thus pressing the clip which punctures both ends of the vessel, its points entering corresponding holes in the bushing of the supporting part of the instrument. The suturing operation takes about four to five minutes. After some 400 experiments, the machine was used in the treatment of 23 cases of aneurysm.

30. KRAKOVSKII N I: Nekotorye voprosy sovremennoi sosudistoi khirurgii [Certain problems of modern vascular surgery] Voennomed Zh, No. 2:22-9, 1957.

A general review of vascular surgery with reference to instrumental angiorrhaphy is presented.

31. LI T M, KUKUSHKIN L I, POTEKHINA L A: Apparat dlia nalozheniia kava-pul'monal'nogo anastomoza (KPA) [Apparatus for the application of cavo-pulmonary anastomosis (KPA)] Grudn Khir, 2(4):121-4, 1960. Illus.

The KPA, a version of a stapler developed in 1958-59 and used in 20 cases of cyanotic heart abnormalities, is similar to other instruments modeled after Gudov's apparatus. After its isolation, the right branch of the pulmonary artery is placed in the hemostatic clamp and resected. The resected end is fitted into the sleeve of the supporting half and its intima is inverted over the sleeve thus forming a cuff. The second clamp is placed on the superior vena cava and the resection is made at the junction with the right auricle. The resected end is fitted into the sleeve of the stapling half and it is also cuffed. The cuffed ends are joined by tantulum staples when the halves are approximated. The KPA is an experimental model.

32. MESHALKIN E N: Anastomoz verkhnei poloi veny i legochnoi arterii u bol'nykh vrozhdennymi porokami serdtsa s nedostatochnost'iu krovi v malom kruge krovoobrashcheniia [Anastomosis of the superior vena cava and the pulmonary artery in patients with congenital defects of the heart with circulatory insufficiency in the lesser circulation] Eksp Khir, 1(6):3-12, 1956. Illus.

One termino-lateral and 20 termino-terminal anastomoses were performed in Fallot's tetralogy and in atresia of the right ventricle. The UKB was used.

33. MESHALKIN E N: Primenenie lineinogo mekhanicheskogo skobochnogo shva v khirurgii serdechno-sosudistoi sistemy [Use of a mechanical lineal staple-suture in surgery of the cardiovascular system] Nov Khir Appar, No. 3:66-74, 1959. Illus.

Results of 174 cases of various types of cardiovascular surgery performed with the BS-1-00 were satisfactory. In 80 commissurotomies there were only four extravasations. Also successful was the outcome of cardiac surgery performed with the aid of the UKB-25, UUS-23 and UKL-60. Somewhat less adequate were the results of one-staple suturing of the cardiac auricle. Cadaver tests indicate that instrumental pyle-pulmonary anastomosis requires only 12 minutes and that suturing of the vena cava can be performed in about 11-12 minutes. Similar operations performed under 15 minutes are usually well tolerated; 20 minutes prove fatal.

34. **MESHALKIN E N: Sovremennoe sostoianie khirurgii serdtsa i perspektivy ee razvitiia [Current status of cardiac surgery and perspectives for its development] Nov Khir Appar, No. 1:55-63, 1957.

Aorto-coronary anastomosis with the ULAV is also diiscussed.

35. MESHALKIN E N, FRANTSEV V I: Operatsiia suzhivaniia legochnoi arterii kak metod lecheniia pri komplekse Eizenmengera [Surgical narrowing of the pulmonary artery as a therapeutic method is Eisenmenger complex] Vestn Khir Grekov, 81(7):29-34, 1958.

A nylon strap was stapled around the pulmonary artery with the aid of the UKB-25 and the OAB.

36. MESHALKIN E N, FUFIN V I: Metod za zatvariane na nezarasnaliia arterialen protok s mekhanichen shev [A method for closing the patent ductus arteriosus with a mechanical suture] Khirurgia (Sofia), 14(2-3):194-9, 1961.

A review and case reports on surgery of patent ductus arteriosus with the UKB-25, UUS, and UAP-20 are presented.

37. MESHALKIN E N, FUFIN V I: Opyt zakrytiia nezarosshego arterial'nogo protoka pri pomoshchii mekhanicheskogo mnogoskobochnogo shva [Results of closing the patent ductus arteriosus with the aid of a mechanical multi-staple suture] Eksp Khir, 5(2):26-34, 1960. Illus.

Various types of tantalum staplers (UUS, UKL and UKB-25) have been sucessfully used in the surgery of patent ductus arteriosus but the UAP-20 is the first instrument designed expressly for this type of surgery. Successful results in 56 operations performed with the UAP-20 and with older instruments prove the usefulness of stapling in patent ductus arteriosus.

38. *MESHALKIN E N, MEDVEDEV I A, FUFIN V I: Novaia metodika zakrytiia nezarashchennogo arterial'nogo protoka mekhanicheskim skobochnym shvom [A new method for the closure of patent ductus arteriosus by means of a mechanical staple-suture] Nov Khir Appar, No. 2:17-23, 1958. Illus.

The UKB-25, BS-1, UUS-1 and UAP have been used since 1956 in closing the ductus arteriosus at both ends by means of two-row tantalum sutures in 40 patients. There were two fatalities.

39. MIKAELIAN A L: Metody obrabotki levogo ushka serdtsa vo vremia operatsii komissurotomii [Method for the management of the left cardiac auricle in commissurotomy] Eksp Khir, 2(3):14-21, 1957.

Animal and cadaver studies on suturing the cardiac auricle in commissurotomy with the BS-1-00 and with other methods suggest the superiority of the instrumental method. BS-1-00 sutures were able to withstand pressures from 120 to 200 mm of mercury and not a single case of hemorrhage was observed in dogs sacrificed from four days to nine months after the operation. Histological reactions to tantalum were less pronounced than to silk.

40. **MIKAELIAN A L: Metody obrabotki ushka serdtsa s primeneniem mekhanicheskogo shva pri operatsiiakh mitral'noi komissurotomii [Methods for the management of the cardiac auricle with the aid of mechanical sutures in mitral commissurotomy] Nov Khir Appar, No. 1:69-74, 1957.

In contrast to conventional sutures which are traumatic, tantalum stapling of the cardiac auricle is relatively harmless. Only minor inflammatory reactions and localized cicatrization with a single case of circumscribed necrosis were observed in animals operated on with the aid of tantalum staplers. Stapled cadaveric auricles were able to withstand pressures up to 200 mm of mercury. Results in 32 patients operated on with the BS-1-00 and in 14 patients operated on with the UKB-25 demonstrate the reliability of tantalum stapling in cardiac surgery.

41. NAUCHNO-ISSLEDOVATEL'SKII INSTITUT EKSPERIMENTAL'NOI KHIRURGICHESKOI APPARATURY I INSTRUMENTOV: Apparat dlia sshivaniia krovenosnykh sosudov AI-625. (Opisanie i rukovodstvo k pol'zovanniu) [Angiorrhaphic apparatus AI-625. (Description and directions for its use)] Moscow, 1956. 40 p. Illus.

Not seen.

42. **PETROVA N P: Eksperimental'nye dannye po primeneniiu sosudosshivaiushchikh apparatov [Experimental data on the use of angiorrhaphic apparatus] Nov Khir Appar, No. 1:98-102, 1957.

In a series of 1,000 experiments the following results were obtained in 260 cases observed during three years or longer: sutures were patent in 220 cases and incomplete in 35 cases; hemorrhage developed in three cases; thrombi were noted in eight cases; stenosis in two cases; obstruction in one case; aneurysms in five cases and dehiscence in three cases. Thrombosis complicated one out of 39 aortoplasties. Homoplastic implantation of the jugular vein into the aorta was successful in eight out of 20 experiments. All three implantations of the human brachial vein into the aorta ended in necrosis. Thirteen out of 22 auto-transplantations of the extremity with the aid of staplers were successful. Kidney transplantation succeeded in most instances--in one case the transplanted kidney functioned normally for over five years. Difficulties in forming an opening in the side of the vessel were responsible for four failures in 14 termino-lateral angiorrhaphies.

43. PETROVA N P: K metodike nalozheniia mekhanicheskogo sosudistogo shva [On a method for the application of mechanical vascular sutures] Vestn Khir Grekov, 84(12):115-9, 1960. Illus.

The individual steps for the application of the apparatus are as follows: the severed ends of the vessel are isolated from the surrounding tissue; hemostatic clamps are applied near the ends; the stapling and the matrix halves are attached to their corresponding clamps; half-sleeves are fitted on the vessel; the ends are cuffed over the sleeves; the halves are approximated; the cuffed ends are anastomosed by pressure applied to the handle; the apparatus is removed.

44. PETROV N P: Mekhanicheskii sosudistyi shov v eksperimente [Mechanical vascular suturing in experimental conditions] Moscow, 1954. (Dissertation)

Not seen.

45. PETROVA N P, KUKUSHKIN L I, POTEKHINA L A: Sovremennye metody zameshcheniia defektov krovenosnykh sosudov [Modern methods in repairing vascular defects] Nov Khir Appar, No. 3:75-80, 1959.

Various homo- and hetero-plastic methods of vascular transplantation are reviewed. Angiorrhaphic staplers are also mentioned.

46. RAKHMANINOV S S: Sosudistyi shov v ognestrel'noi infitsirovannoi rane. (Eksperimental'noe issledovanie) [Vascular suturing in infected wounds. (Experimental study)] Vestn Khir Grekov, 75(3):55-60, 1955.

Histological and x-ray examinations of sutures in dog extremities injured by pistol shots suggest the superiority of instrumental over conventional angiorrhaphy in repairing gunshot vascular injuries. Tantalum staplers have, however, some shortcomings. Among the principal disadvantages are the need for the resection of lateral branches of the anastomosed vessel, the unpredictability of vascular patency, and the bulkiness, complexity and susceptibility to corrosion of the staplers.

47. RATNER G L: Metody vosstanovleniia nepreryvnosti krovenosnogo sosuda pri boevykh raneniiakh [Methods for the restoration of the continuity of blood vessels in combat injuries] Voennomed Zh, No. 7:32-5, 1959.

Tantalum stapling is also discussed.

48. SELEZNEV IU A: Sravnitel'naia otsenka sosudistogo shva s pomoshch'iu apparata i ruchnogo s posoba [Comparative evaluation of vascular sutures applied by instrumental and manual methods] Tezisy Dokladov. Minskii Meditsinskii Institut, 1956.

Not seen.

49. **SHEINBERG S I: Sosudosshivaiushchie apparaty [Angiorrhaphic apparatus] Nov Khir Appar, No. 1:96-7, 1957.

Because of some outstanding deficiencies of earlier models, a new type of angiorrhaphic stapler was constructed. This apparatus applies end-to-end sutures on blood vessels 2.5 mm to 8 mm in diameter. In addition, it has improved scales and hemostatic clamps and, although it is composed of 21 parts, it can be assembled within two minutes. Simultaneously with the development of this termino-terminal angiorrhaphic apparatus, an instrument for the termino-lateral stapling of a cuffed vessel into the opening of another vessel was produced. The possibility of a new type of stapler which would combine the qualities of these two instruments is now under consideration.

50. SHEINBERG S I, KOZINA M G, NAGAEVA L I, EFROS G A: Usovershenstvovanie konstruktsii sosudosshivaiushchikh apparatov [Structural improvement of angiorrhaphic instruments] Med Promyshl SSSR, 10(1):30-4, 1956. Illus.

The AI-625 is an improved version of an older instrument. The apparatus has separate stapling and support parts which are joined by a hinge controlling the gap between these two parts. One part has a hemostatic clamp and the other part has a cuff-clamp for holding the ends of the blood vessel. Two levers are provided for independent extrusion of the staples. There are no small parts in the apparatus.

51. SHIMANKO I I: Otdalennye rezul'taty primeneniia mekhanicheskogo sosudistogo shva pri operatsiiakh po povodu anevrizm s nalozheniem anastomoza konets v konets [Remote results after mechanical angiorrhaphy used in surgery of aneurysms by means of end-to-end anastomosis] Nov Khir Arkh, No. 2:58-63, 1960.

In 26 out of 35 operations blood flow was completely unobstructed; it was partially obstructed in three cases and totally obstructed in six cases after surgical therapy of aneurysms involving various arteries and veins.

52. SIROTKINA M G: Zameshchenie defekta polykh ven (eksperimental'noe issledovanie) [Replacement of defects of the venae cavae (experimental studies)] Khirurgiia, 37(5):12-5, 1961.

Capron, Ivalon and Dacron prostheses were implanted into the venae cavae in 45 dogs. Results with tantalum staplers proved superior to results with manual suturing methods.

53. VASCULAR surgery in the USSR. Curr Probl Sov Med (Berlin), No. 3:82-92, 1961. Illus.

The developments in mechanical angiorrhaphy are reviewed.

54. WOLF W, WENDT F: Maschinelle End-Zu-End-Arteriennaht und alloplastischer Gefassersatz mit Hilfe des sowj. Universal-Nahapparates [Instrumental end-to-end suturing of the arteries and alloplastic substitution of the blood vessels with the aid of a Soviet universal suturing apparatus] Thoraxchirurgie, 8:633-42, 1961. Illus.

In the first series 16 dogs were used for experimental angiorrhaphy of the thoracic aorta, abdominal aorta and femoral artery. In the second series staplers were used in the implantation of Dacron prostheses in aortic defects in dogs. Satisfactory results were obtained in all instances.

GASTROINTESTINAL SURGERY

see also: 5, 10, 12, 87, 112, 114, 120, 127.

55. ANDROSOV P I: Opyt klinicheskogo primeneniia apparata dlia ushivaniia kul'ti zheludka dvukhriadnym pogruzhnym shvom [Clinical results after the use of an apparatus for applying two-row embedded sutures in the gastric stump] Vestn Khir Grekov, 84(4):43-5, 1960. Illus.

See next article for abstract.

56. ANDROSOV P I, BOBROV B S: Opyt klinicheskogo primeneniia apparata dlia ushivaniia kul'ti zheludka dvukhriadnym pogruzhnym shvom [Clinical results after the use of an apparatus for applying two-row embedded sutures in the gastric stump] Nov Khir Appar, No. 3:91-4, 1959. Illus.

A vise-like apparatus was developed in 1956 for the rapid and patent closure of the stump in gastrectomy. The stomach is placed between the jaws of the apparatus and compressed. The first row of tantalum staples is applied through the whole thickness of the gastric walls, and after dissection adjacent to the line of staples, the cut edges are invaginated. The second row is applied only through the sero-muscular layers, thus establishing the continuity of the serous tegmen of the stomach. After extensive experimentation, the apparatus was used successfully in numerous clinical cases. Two to five minutes are required to staple the gastric stump.

57. **BABKIN S I, ASTAF'EV G V, KALININA T V: Sovremennoe osnashchenie operatsii na kishechnike [Modern equipment for intestinal surgery] Nov Khir Appar, No. 1:129-34, 1957. Illus.

Prominent among some 100 types of instruments currently used in intestinal surgery is a two-staple apparatus for suturing the mesenteric vessels developed by Babkin, Lemina and Beliakov and an enterorrhaphic apparatus developed by Babkin, Astaf'ev, Kalinina and Anisimova.

58. BABKIN S I, BOBROV B S: Novyi apparat dlia ushivaniia kul'ti zheludka [A new apparatus for suturing the gastric stump] Med Promyshl SSSR, 11(4):56-8, 1957. Illus.

The UKZH-7 is a vise-like stainless steel device for the rapid and simplified suturing of the stump with two rows of square tantalum-niobium staples. The apparatus has two parts: the lower half which houses the matrix, and the upper half which houses the stapling mechanism and consists of two rows of open vertical grooves for staples and the extruding device located above. Pressure exerted on the levers forces the staples from the grooves through the gastric walls which are immobilized between the halves of the apparatus. The staples are bent against the matrix in the lower half of the apparatus.

59. BOBROV B S: Apparat dlia nalozheniia serozno-myshechnykh shvov [Apparatus for the application of sero-muscular sutures] Med Promyshl SSSR, 12(12):47-9, 1958. Illus.

Ths SMSH was developed in 1957 for performing rapid sero-muscular gastrointestinal, intestino-intestinal, termino-terminal, termino-lateral and latero-lateral anastomoses.

60. **BOBROV B S, ANDROSOV P I, VYRZHIKOVSKAIA M F, KRIUCHOVA G S, LIN'KOVA M N: Eksperimental'nye predposylki k primeneniiu v klinike apparata dlia ushivaniia kul'ti zheludka [Experimental principles for the clinical use of an apparatus for gastric stump suturing] Nov Khir Appar, No. 1:125-8, 1957.

The apparatus, developed by Bobrov and his associates, varies from the existing models in its lightness which was reduced from 1.3 kg and 2.5 kg to only 0.9 kg and in its ability to apply two-row embedded sutures. The first row of sutures is placed at the edge of the incision penetrating all the layers of the stomach. The second row is applied after the invagination of the cut and stapled edges of the stomach and penetrates only the sero-muscular layers. Extensive anatomical, physiological and x-ray studies failed to reveal any abnormal reactions in dogs. Two to five minutes were required for the operation.

61. GRITSMAN IU IA: Mekhanicheskii tantalovyi shov v khirurgii zheludka [Mechanical tantalum suturing in gastric surgery] Moscow, Medgiz, 1961.

Not seen.

62. KALININA T V: Apparat dlia sshivaniia kishok [Apparatus for suturing the intestines] Nov Khir Arkh, No. 2:115-8, 1958. Illus.

The apparatus was developed by Babkin, Astaf'ev, Kalinina and Anisimova. Two separate clamps, one attached to the stapling mechanism and the other to the matrix, are fixed individually on the resected ends of the intestine. After their alignment, the clamps are approximated and the intestine is sutured with tantalum staples. The apparatus was used successfully in clinical surgery after extensive cadaver and animal research.

63. KALININA T V: Nalozhenie kishechnogo anastomoza konets v bok s pomoshch'iu apparata [Application of end-to-side intestinal anastomoses with the aid of an apparatus] Vestn Khir Grekov, 86(5):131-4, 1961. Illus.

The apparatus consists of two halves -- each representing two parallel bars with slots in between. One half is the stapler and the other half is the matrix. The intestine to be implanted is placed in the slot of one half while the wall of the other intestine is pulled through the slot of the other half. The intestine is now resected and the cut edges are pulled outward and fixed on the flat surface of the apparatus.

The same procedure is repeated with the intestine in the other half. When the halves are approximated, the lumen and the resected edges of the opposite intestines should correspond. The anastomosis is performed by stitching with tantalum staples around the edges at the point of contact. The apparatus was used successfully in 17 experiments and in 18 clinical cases in patients from four to 62 years of age.

64. KALININA T V, ASTAF'EV G V: Sshivanie kishok mekhanicheskim shvom [Anastomosis of the intestine with a mechanical suture] Vestn Khir Grekov, 79(7):129-32, 1957. Illus.

The apparatus was developed by Astaf'ev and Babkin for end-to-end and end-to-side intestinal anastomoses. It consists of a stapler attached to a clamp and a matrix attached to another clamp. These clamps are fixed individually below and above the intended resection. The intestine is resected and the resected ends are fixed on the proximal surfaces of the apparatus in such a manner that, after their alignment, the fixed tissues and the lumen of the intestine will correspond. The intestine is anastomosed with tantalum staples around the edges. The operation requires about one minute.

65. *KALININA T V, KRIUCHKOVA G S: K voprosu sshivaniia kishok tantalovymi skobkami (eksperimental'noe issledovanie) [On the problem of intestinal anastomosis with tantalum staples (experimental studies)] Nov Khir Appar, No. 2:13-6, 1958.

End-to-end, side-to-side, and end-to-side sutures were applied through all layers of the intestine with a tantalum stapler in 116 dogs after the resection of the colon at the splenic angle. Clinical, x-ray and histological observations revealed only moderate reactions to the staples. The efficiency of the sutures and the healing process was better in animals operated on with the aid of tantalum staplers than in controls operated on with the aid of soft ligation material.

66. VITTENBERGER N G: Apparat dlia rezektsii zheludka i nalozheniia anastomozov na zheludochno-kishechnom trakte zakrytym sposobom i nash opyt ego primeneniia [Apparatus for gastric resection and gastro-intestinal anastomoses by means of a closed method and our experiences with its application] Nov Khir Arkh, No. 1:74-7, 1958. Illus.

The apparatus was developed in the Mukachevo city hospital. It consists of two movable jaws with corrugated surfaces, a magazine for the staples, handles for extruding the staples, a device for closing the jaws and a needle fitting a hole which passes horizontally through both jaws when the corrugated surfaces are closed. The stomach is placed between the jaws and, after being compressed and corrugated by the surfaces, it is sutured with silver staples and stitched through its wavy surfaces by the needle inserted into the hole. The resection is performed with an electric knife which also coagulates the resected edges.

67. VOLODIN V M: Mekhanicheskii shov miagkikh tkanei tantalovymi skrepkami v eksperimente [Mechanical suturing of soft tissue with tantalum staples in experimental conditions] Zdravookhr Belorussii, 6(7):45-7, 1960

Histological studies made at various intervals ranging from several days to several months after tantalum, silk and catgut suturing of the stomach, intestine and appendix in experimental animals demonstrate that tantalum is the least harmful to the tissue.

68. ZHMUR V A: K metodike pishchevodno-zheludochnogo anastomoza pri pishchevodno-kardial'noi rezektsii [On a method for gastroesophageal anastomosis in cardio-esophageal resection] Grudn Khir, 1(3):87-91, 1959.

The UKL was used in suturing the mucous membranes after exposure of the stomach. Conventional silk sutures were used elsewhere.

69. KALININA T V, KUKUSHKIN L I: Sshivanie nervov apparatom [Nerve suturing with an apparatus] Vestn Khir Grekov, 81(11):122-6, 1958. Illus.

The apparatus was developed by Kukushkin, Burlakov and Kalinina in 1954. It operates as follows: the ends of the severed nerve are enclosed in separate sleeves located between the matrix and the stapler.

The sleeves are provided with rings projecting inside to prevent the epineurium from slipping. When approximating the sleeves, the operator presses the severed ends against each other, thus forming bulges which are sutured through the epineurium by staples extruded from the magazine. After penetrating the epineurium, the staples are bent against the matrix. Universal angiorrhaphic devices can also be adapted for neurorrhaphy by means of special nerve-holding sleeves and bushings. Experiments in dogs indicate that a surgeon should be able to staple severed nerves without any assistance.

NEUROLOGICAL SURGERY

see also: 4, 112, 120, 126.

70. ***KALININA T V, KUKUSHKIN L I, BURLAKOV A I: K metodike sshivaniia nervov [On a method for nerve suturing] Nov Khir Appar, No. 2:58-62, 1958. Illus.**

The technic of instrumental neurorrhaphy is a follows: the ends of the severed nerve are fixed in individual half-sleeves supplied with inside projections which compress the epineurium near the proximal end of the sleeve. The approximation of the sleeves results in pressing the nerve ends together thus bulging the epineurium and making it possible to apply circular epineural sutures with tantalum staples extruded from the magazine located on one side and bent against the matrix located on the other side of the sleeves. Earlier difficulties with nerve-holders have been solved, and today it is possible for a surgeon to apply instrumental neurorrhaphy rapidly and without any assistance.

71. **KALININA T V, KUKUSHKIN L I, BURLAKOV A I, BOGOMOLOVA O R: Apparat dlia sshivaniia nervov [Apparatus for nerve suturing] Nov Khir Appar, No. 3:100-5, 1959.**

The apparatus developed by Kukushkin, Burlakov and Kalinina for one-stage end-to-end nerve suturing consists of a stapling bushing which houses the staple magazine and the extrusion device, a support bushing which houses the matrix for bending the staples, and a nerve holder. The nerve is sutured through the epineurium after its severed ends are pressed against each other to form epineural bulges. This stapler enables a surgeon to join in one stage nerve trunks from 2.5 to 5 mm in diameter without any assistance.

72. KUKUSHKIN L I, BURLAKOV A I, KALININA T V: Apparat dlia nalozheniia mekhanicheskogo epinevral'nogo shva [Apparatus for the application of mechanical epineural sutures] Med Promyshl SSSR, 13(3):44-6, 1959. Illus.

The ends of the severed nerve are fixed in the sleeves between the stapler and the matrix. The approximation of the sleeves presses the ends together thus forming bulges which make it possible for tantalum staples to join the severed nerve end-to-end through the epineurium. Earlier models of this apparatus were useful only for suturing nerves of the same diameter, but new types are adaptable to nerve trunks varying in diameter from 2.5 mm to 5.0 mm.

73. KUKUSHKIN L I, PETROVA N P: Universal'nyi sosudo-nevrosshivaiushchii apparat [Universal angio-neurorrhaphic apparatus] Voenn ›med Zh, No. 7:27-32, 1959. Illus.

The principle of instrumental angiorrhaphy is based on joining the cuffed ends of the severed vessel by tantalum staples which form a circular suture without entering the lumen of the vessel. The principle of instrumental neurorrhaphy is based on joining the ends of the severed nerve by tantalum staples which penetrate epineural bulges formed when the ends are pushed against each other. The apparatus described in this article incorporates the mechanisms capable of performing both of these functions. In addition to suturing arteries, veins and nerves of various diameters, the apparatus is also useful in anastomosing severed ureters and bile ducts. Results of experimental angiorrhaphy, grafting preserved blood vessels and alloplastic material and anastomosing ureters with the aid of this apparatus demonstrate the superiority of tantalum stapling over conventional methods. The apparatus was also used with success in a case of traumatic femoral aneurysm.

PULMONARY SURGERY

see also: 2, 112, 117, 120, 134.

74. AMOSOV N M: Tudoresectio bronchus- es ervarrogeppel [Pulmonary resection with mechanical bronchial suturing] Tuberkulozis (Budapest), 13(12):353-7, 1960. Illus.

The results of 2,995 pulmonary resections performed from 1949 to 1960 are reported. The UKL-60 was used in 670 cases, including 38 simultaneous bilateral resections.

75. AMOSOV N M, BEREZOVSKI K K: Razvitie khirurgii legkikh na Ukraine [Development of pulmonary surgery in the Ukraine] Grudn Khir, 3(2):72-7, 1961.

The UKB-25 and UKL-60 were used in 461 pulmonary resections in 21 hospitals during 1958-59.

76. AMOSOV N M, BEREZOVSKII K K, ZABRODA G S: Opyt 100 rezektsii legkikh s primeneniem UKL-60 [Results of 100 pulmonary resections with the UKL-60] Eksp Khir, 3(6):3-7, 1958.

Experience with various types of pneumonectomy and lobectomy performed with the UKL-60 demonstrates non-traumatic, simple, and time-saving qualities in instrumental suturing of the bronchial stump. Whereas conventional lung excision requires about 30-60 minutes, the same operation can be performed in five to fifteen minutes with the aid of the UKL-60. Complications were usually due to inexperience rather than to surgical technics. Faulty clamping was responsible for seven cases of blood exudation, one case of arterial laceration, one case of pulmonary laceration and one case of transcavitary resection. A bronchial fistula developed in one case. No pathological reactions to tantalum were observed.

77. AMOSOV N M, DEDKOV I P: O dvustoronnikh rezektsiakh legkikh [On bilateral lung resections] Khirurgiia , 35(1):19-24, 1959.

The UKL-60 was used in 21 resections.

78. ANDROSOV P I, POTEKHINA L A, SAVCHENKO E D, STREKOPYTOV A A, THLIAKOVA L S, SHEINBER S A: Novyi sposob ushivaniia kul'ti bronkha [A new method for suturing the bronchial stump] Khirurgiia, No. 8:66-70, 1955. Illus.

The apparatus consists of a shaft with a hooked end, a stapling magazine sliding along the shaft and a screw regulating the distance between the magazine and the hook. The hook houses the matrix for bending the staples and the magazine houses the extruding apparatus operated by a handle near the screw. The apparatus is clamped around the bronchus as close to the bifurcation as possible. The screw is then tightened and the bronchus is stapled by pressure applied on the handle. The operation requires about one to two minutes. Experimental and clinical results of operations performed with the aid of this apparatus were good.

79. ASTRAKHANTSEVA G I: Elektrokardiograficheskie izmeneniia vo vremia operatsii no legkikh [Electrocardiographic changes during pulmonary surgery] Grudn Khir, 1(6):43-50, 1959.

Peroperative ECG studies in 84 cases of pulmonary surgery performed under local anesthesia revealed only minor transitional rhythm changes. Auricular extrasystole was observed in five patients operated on with the aid of the UKB and in eight patients operated on with the aid of the UKL-60.

80. BEREZOVSKII K K: Kombinirovannoe udalenie doli i segmentov drugikh dolei legkogo pri tuberkuleze [Combined excision of a pulmonary lobe and segments of other lobes in tuberculosis] Probl Tuberk, 39(4):55-60, 1961.

The UKL-60 was used in 30 out of 74 resections.

81. CHEFRANOV V S: Khirurgicheskoe lechenie tuberkulom legkikh [Surgical therapy of pulmonary tuberculomas] Probl Tuberk, 39(4):47-52, 1961.

Use of the UKL-60 in conservative resections is also discussed.

82. DMITRIEVA P E, MAISIUK A P: Plastika kul'ti bronkha v eksperimente [Plastic management of the bronchial stump in experimental conditions] Eksp Khir Anest, 6(2):19-22, 1961.

The presence of inflammation often prevents staples from penetrating the whole thickness of the bronchial wall and the purpose of one of the experiments was to study the feasibility of silk suture reinforcement of bronchial stumps stapled with the UKB-25. Severe necrotic and inflammatory reactions to silk, however, eliminate this method for use in clinical practice.

83. GARIN N D: Mekhanicheskaia pereviazka sosudov legkogo v klinike [Mechanical ligation of pulmonary vessels in clinical conditions] Eksp Khir, 1(4):33-6, 1956. Illus.

The AS-1 and BS-1-00 were developed in 1952 by Bakulev for ligating bronchial vessels in pulmonary surgery. The ULAV was developed by Tiarasov and Garin and was later improved by Tanich for two-staple suturing of the pulmonary arteries and veins. Thirty one cases of radical pulmonary surgery performed with these instruments indicate that tantalum staplers insure a rapid, non-traumatic, aseptic and safe method for vascular suturing and ligation in pulmonary surgery.

84. *GARIN N D, DANIEL'SON A K: Reflektornye izmeneniia gemodinamiki i dykhaniia u sobak pri mekhanicheskom ushivanii kornia legkogo apparatom UKL-60 [Reflex hemodynamic and respiratory changes in dogs after mechanical suturing of the radix pulmonis with the UKL-60 apparatus] Nov Khir Appar, No. 2:24-30, 1958.

Arterial and venous pressures, ECG, pulse and respiratory movements were investigated before and after pulmonary excision performed with the aid of the UKL-60 in 20 dogs. The absence of irreversible reactions indicates that tantalum staplers should be considered as safe in clinical surgery.

85. GARIN N D, GORKIN N S, SAVCHENKO E D, STREKOPYTOV A A: Apparat dlia ushivaniia kornia legkogo [Apparatus for suturing the radix pulmonis] Nov Khir Appar, No. 3:81-6, 1959.

The UKL-60 was developed after preliminary experiences with the ULAV, UKB and BS-1-00. The apparatus is applied upward from the site of the lower pulmonary vein toward the bronchus by the insertion of the lower hook around the radix. After placing the apparatus in position, the upper jaw is at a right angle to the radix and close to the

tracheal bifurcation. The lung is compressed between the matrix and the stapler when the upper jaw is pushed toward the hook by means of the screw. A 21-staple two-row checker-board suture up to 60 mm in length is applied by pressing the handle. The operation requires about four minutes. After extensive cadaver and animal experiments, the UKL-60 was used in some 500 clinical cases of pulmonary surgery.

86. GARIN N D, SAVCHENKO E D: Primenenie apparata dlia mekhanicheskoi pereviazki sosudov kornia legkogo v eksperimente [Use of an apparatus for the mechanical ligation of the blood vessels of the radix pulmonis in experimental conditions] Khirurgiia, No. 9:80-4, 1955. Illus.

The ULAV, and apparatus developed by Tiarasov, consists of a shaft with a hook housing the matrix for bending the staples, and a magazine containing the stapling mechanism. A plunging device pushes the magazine along the shaft toward the hook thus activating the stapling mechanism. The apparatus applies three-staple ligations. The first staple encloses the vessel in a circular suture and the remaining two, placed distally, ligate the vessel. After some 500 successful experiments, the apparatus was submitted to clinical institutions for approval.

87. **GARIN N D, SAVCHENKO E D, ANDROSOV P I, STREKOPYTOV A A, TRUSOV M M, TANICH L F: Sovremennoe osnashchenie legochnoi khirurgii i eksperimental'no-klinicheskie dannye po primeneniiu apparatov i instrumentov NIIEKHAiI [Modern equipment for pulmonary surgery and experimental and clinical data on the application of instruments and apparatus of the Scientific Research Institute of Experimental Surgical Apparatus and Instruments] Nov Khir Appar, No. 1:38-44, 1957.

After the experience with five original instruments developed for pulmonary surgery by Bakulev and his associates in 1952, Tiarasov, Garin, Tanich and Savchenko constructed in 1955 the ULAV, a tantalum stapler for pulmonary vessels. The reliability of this instrument was confirmed in 20 experimental pneumonectomies performed without a single fatality. The UKB, a bronchial stump stapler, was developed shortly afterward by Strekopytov, Androsov, Protekhina, Tuliakova and Savchenko. After extensive animal and cadaver studies which demonstrated that tantalum stapling is technically superior and less traumatic than conventional silk suturing, the ULAV was used in 22 and the UKB in more than 300 clinical pneumonectomies. Ligation of pulmonary vessels was performed within one to two minutes and results were uniformly good. In addition, the ULAV was used in ligating the bile ducts, ureters, appendix and other organs, and the UKB was applied in suturing the cardiac auricle and the esophageal stump.

88. **GERASIMENKO N I: Primenenie mekhanicheskikh shvov na bronkhakh i sosudakh pri operatsiiakh na legkikh u bol'nykh tuberkulezom [Use of mechanical bronchial and vascular suturing in pulmonary surgery in tuberculous patients] Nov Khir Appar, No. 1:45-51, 1957.

The UKB-7 and ULAV were used. In the postero-lateral approach the bronchus was ligated after resection of the bronchial branch of the vagus nerve and after positioning of the apparatus in a special tunnel. The effectiveness of the suture was tested by air insufflated into the bronchus with an anesthetic apparatus. In the anterior approach the bronchus was ligated after the blood vessels of the radix were ligated and resected. Fifteen bronchial fistulae developed after 64 operations. Additional silk ligations were required in most cases. Stapling of the bronchi supplying air to lobes with tuberculous cavities was used in creating artificial atelectasis in three cases where pneumonectomy was not indicated. Stapling was also applied in three cases of wedge pneumonectomy. Recanalization was observed in three out of 19 cases of bronchial ligation. The bulkiness, the lack of a bronchial resistance indicator and frequent malfunctions are the principal shortcomings of surgical staplers.

89. GERASIMENKO N I: Segmentarnaia i subsegmentarnaia rezektsiia legkikh u bol'nykh tuberkulezom [Segmental and subsegmental pulmonary resection in patients with tuberculosis] Moscow, Medgiz, 1960. 143 p.

Use of the UKL-60 is also discussed.

90. GESELEVICH A M, GARIN N D, GORKIN N S, STREKOPYTOV A A: Apparat dlia ushivaniia kornia legkogo malyi (UKL-40) [A small model of the apparatus for suturing the radix pulmonis (UKL-40)] Grudn Khir, 1(3):118-22, 1959. Illus.

The UKL-40 is a scaled-down version of the UKL-60 developed for the chess-board two-row suture of the radix pulmonis up to 40 mm in length. The parts of the apparatus are: a frame with a hook housing the matrix, a stapling device sliding along the frame toward the hook, a wing-nut controlling the distance between the matrix and the stapler, an exchangeable staple magazine, a removable handle activating the stapler, a spring, and a fork fixing the radix pulmonis. After placing the radix between the matrix and the stapler, the wing-nut is turned to compress the lung. Pressure applied to the handle activates the stapler. The stapled lung is now excised. Positioning of the apparatus at a right angle to the radix and close to the trachea insures a flush suture.

91. GLASSON A A: Rezektsiia legkogo pri tuberkuleze v sanatornykh usloviiakh [Pulmonary resection in tuberculosis in a sanatorium] Grudn Khir, 3(3):58-61, 1961.

The UKL-60 was used in 41 lobectomies and segmental resections performed under local anesthesia. In 20 cases the apparatus was applied to the whole radix (in lobectomies) and to the whole lung (in segmental resections); in 14 cases the apparatus was applied to the radix after ligation of the arteries; and in seven cases the apparatus was applied separately to the bronchus and vessels. In 35 operations one or two applications were sufficient but in four cases three applications and in two cases five applications were required. In all but three cases, where minor exudations developed, sutures remained patent. There were no peroperative complications but one postoperative fistula developed. There were no fatalities.

92. KOLESNIKOV I S: Rezektsiia legkikh. Pokazaniia, tekhnika operatsii, poleoperatsionnyi ukhod [Pulmonary resection. indications, surgical technics, postoperative care] Moscow, Medgiz. 314 p.

Use of tantalum staplers in bronchial stump suturing is also discussed.

93. KUZIUKOVICH P M: Primenenie apparata UKL-60 pri rezektsii legkikh po povodu tuberkuleza [Use of the UKL-60 apparatus in pulmonary resection for tuberculosis] Zdravookhr Belorussii, 6(2):15-8, 1960.

After a general review of tantalum stapling in pulmonary surgery, the author reports the results of 20 pulmonary resections performed with the aid of the UKL-60. Although no fatalities or bronchial fistulae occurred, there were six cases of hemoptysis caused by excessive lung compression, two cases of contralateral pneumonia, one case of bilateral pneumonia and two cases of suppurations. It should be noted that 6-18 per cent of the lung operations performed without the aid of tantalum staplers is usually complicated by bronchial fistulae. In addition, the UKL-60 simplifies and shortens pulmonary surgery, thus lessening the risk.

94. LUSHNIKOV E S: O mekhanicheskom tantalovom shve bronkha i trakhei [On mechanical tantalum suturing of the bronchus and trachea] Grudn Khir, 1(2):64-71, 1959.

The UKB-25 was developed after some unsatisfactory experiences with the BS-1-0 and UKB-7 in pulmonary surgery. The UKB-25 is used as follows: the apparatus is placed in the right hand while the left index finger is wrapped around the main bronchus to serve as a guide; the vagus nerve is forced out of the way to allow positioning of the apparatus near the bifurcation; after placement of the apparatus, the bronchus or the trachea is sutured by pressing the handles; the apparatus is removed. The UKB-25 was used in 350 radical pulmonary operations, eight of which were complicated by bronchial fistulae.

95. LUSHNIKOV E S: O novoi metodike obrabotki elementov kornia legkogo pri pnevmonektomiiakh [On a new method for the management of the radix pulmonis in pneumonectomies] Nov Khir Appar, No. 3:87-90, 1959.

The development of the UKB in 1954 should be considered as a major step in solving the difficult problem of suturing the radix pulmonis and high bronchial amputation in pulmonary surgery. In 205 cases of radical pulmonary surgery there were only eight cases of adhesions. The UKL-20, a new apparatus for suturing the radix pulmonis, was introduced in 1957. It can be used also in suturing large blood vessels.

96. PULATOV M A: Sovremennye modifikatsii ushivaniia kul'ti bronkha pri tuberkuleze [Modern modifications of bronchial stump suturing in tuberculosis] Zdravookhr Tadzhik, 8(2):48-50, 1961.

The development of bronchial stump management in the surgical therapy of tuberculosis, and tantalum stapling with the UKL-60 and UKB-25 are reviewed.

97. RATNER G L: Obunifikatsii v konstruktsii khirurgeicheskikh instrumentov [On the unification of surgical instrument construction] Med Promyshl SSSR, 13(4):11-2, 1959.

Although a number of recently developed Soviet semi-automatic instruments operate on the same principle and serve the same purpose, the construction of individual devices varies considerably. The UKB-16, UKB-25, UKL-60, UUS-23 and the apparatus for suturing the patent ductus arteriosus could be unified into a single instrument which, with exchangeable parts, could serve a variety of purposes.

98. SAVCHENKO E D: K voprosu o zazhivlenii kul'ti bronkha v eksperimente [On the problem of healing of the bronchial stump in experimental conditions] Eksp Khir, 2(1):36-42, 1957.

Histopathological observations on 80 bronchial stumps sutured with the UKB-6 in dogs reveal that ten days after the operation there is a development of connective tissue adhesions which are covered with bronchial epithelium. Six months later these adhesions are covered with bronchial mucosa. Necrosis and fistulae were completely absent in this experiment.

99. SAVCHENKO E D: Patologoanatomicheskie dannye o sostoiani kul'tei legochnykh sosudov pri pul'monektomii v eksperimente [Patho-anatomical data on the condition of the vascular stump after experimental pneumonectomy] Eksp Khir, 1(4):36-42, 1956.

Histological examination of 80 arteries and 102 veins stapled with the ULAV reveals that coalescence of the vascular stump is accomplished by "bridges" which originate in the intima and, 15-20 days later, involve all layers of the operated vessel. The presence of numerous villi, protuberances and elevations indicate disorderly proliferation of the intima. This proliferation is also responsible for thrombi found in the vascular stump. Reactions to tantalum are usually less pronounced than to silk.

100. SAVCHENKO E D: Patologoanatomicheskie dannye o zazhivlenii kul'ti bronkha pri primenenii apparata UKB-7 v klinike [Patho-anatomical data on the healing of the bronchial stump after using the UKB-7 apparatus in clinical conditions] Khirurgiia, 35(4): 87-92, 1959.

Autopsy examination of 11 bronchial stumps revealed that sutures were effective and completely without fistulae. About 10-15 days after suturing, the bronchial walls coalesce through adhesions which are later covered by a well-vascularized bronchial epithelium. There were no reactions to tantalum.

101. SERGEEV V M, BUIANOV V M: Uspekhi sovremennoi grudnoi khirurgii [Progress of modern thoracic surgery] Moscow, Medgiz, 1959. 115 p. Illus.

The UKB, ULAV and UKL are also discussed.

102. SEVEROV V S: Primenenie apparata UKL-60 pri rezektsii legkikh u bol'nykh tuberkulezom [Use of the UKL-60 apparatus for pulmonary resection in tuberculous patients] Probl Tuberk, 39(4):100-2, 1961.

The UKL-60 was used in six pneumonectomies, 18 lobectomies and 51 partial resections. In one group the apparatus was applied on the bronchus and blood vessels of the radix or on the whole lung whereas in the other group the UKL-60 was applied only on blood vessels and the UKB-25 was used in stapling the bronchial stump. In a flat resection the apparatus was applied only once and the resection was performed along the surface of the apparatus; in a wedge resection the apparatus was applied twice and a wedge containing pathological foci was resected from the lung. The apparatus was also used in partial resections with conventional management of the bronchial stump. In four patients air seepage developed and in two patients blood exudation developed on the operating table. Systolic exudations from a stapled pulmonary artery were observed in one patient. One-and-one-half to two months after surgery five patients developed bronchial fistulae.

103. SHELOMOVA T P: Opyt khirurgicheskogo lecheniia zabolevaniia legkikh [Results of surgical therapy in pulmonary diseases] Khirurgiia, 36(12):104-9, 1960.

A statistical study of 300 pneumonectomies performed during the past 11 years, including operations using the BS-1-00 and UKL-60 is presented.

see also: 42, 87, 112.

104. DUNAEVSKII L I: Zadachi i perspektivy razvitiia instrumental'noi tekhniki v urologii [Problems and perspectives in the development of instrumental technics in urology] Nov Khir Appar, No. 3:30-4, 1959.

Urological suture material should be suitable for sterilization, should not produce tissue reactions, should not react with urinary salts, should be strong, and should produce effective sutures. In view of these specifications, tantalum proved superior to catgut in urological surgery, but experimental results with a tantalum stapler (a modified angiorrhaphic apparatus) were not satisfactory.

105. KALININA T V: K voprosu o peresadke pochki (eksperimental'noe issledovanie) [On the problem of kidney transplantation (experimental investigation)] Urologiia, No. 1:43-9, 1955.

The purpose of this experiment was to investigate the difference in results of auto- and homo-transplantation of the kidney and the fate of transplanted organs. Seven failures in thirteen auto-transplantations should be blamed on inadequacies in mechanical angiorrhaphy.

106. PETRAKOVICH G N: O sshivanii sosudosshivaiushchim apparatom mochetochnika, ranennogo pri operatsiiakh [On angiorrhaphic instrumental suturing of the ureter injured during surgery] Akush Ginek, 37(2):78-80, 1961.

Ureters were successfully anastomosed in two gynecological patients.

107. PETROVA N P, KRIUCHKOVA G S, VYRZHIKOVSKAIA M F, SUPKO I S, GRIGOR'EV V E: Tantalovyi glukhoi shov mochevogo puzyria [Blind tantalum suturing of the urinary bladder] Nov Khir Appar, No. 3:95-9, 1959.

Two-row embedded tantalum sutures were applied to the urinary bladder in dogs by means of a single-staple apparatus. Clinical, x-ray and histological studies in a one-year follow-up demonstrated good results in all instances. Especially important were findings that the efficiency of the sutures was good, that there were no pathological reactions to the tantalum and that no deposits were found on the staples. As a consequence of the satisfactory experimental results, tantalum stapling is now being introduced into clinical urological practice and an apparatus for lineal suturing of the bladder is currently under development.

108. UCHUGINA A F, KAZIMIROV L I: Sshivanie mochetochnika mekhanicheskim tsirkuliarnym shvom pri pomoshchi apparata dlia sshivaniia sosudov [Mechanical circular suturing of the ureter with the aid of an angiorrhaphic apparatus] Urologiia, 26(3):51-2, 1961.

The ASTS-8 apparatus was used in a case of pyelolithotomy.

109. VVEDENSKII S P: K tekhnike tsirkuliarnogo shva mochetochnika sosudosshivaiushchim apparatom [On a technic of circular ureteral suturing with an angiorrhaphic apparatus] Urologiia, 26(3):34-6, 1961.

The ASTS-4 angiorrhaphic apparatus was used in two series of ureteral suturing in dogs. In the first series the ureters were anastomosed by means of an angiorrhaphic cuffing method. In the second series a polychlorovinyl tube was used. Somewhat better results obtained in the second group suggest the superiority of the polychlorovinyl method.

GENERAL

110. ANAN'EV M G: Novaia meditsinskaia tekhnika [New medical technics] Med Sestra, 19(8):25-30, 1960.

Surgical staplers are also discussed.

111. **ANAN'EV M G: Novaia tekhnika v khirurgii i dal'neishie perspektivy ee razvitiia [A new technic in surgery and further perspectives for its development] Nov Khir Appar, No. 1:9-14, 1957.

See next article for abstract.

112. ANAN'EV M G: Novaia tekhnika v khirurgii i perspektivy ee razvitiia [A new technic in surgery and perspectives for its development] Med Promyshl SSSR, 11(3):3-6, 1957.

Already developed or currently under development are the following instruments: a stapler for circular angiorrhaphy of vessels 1.2 to 8 mm in diameter; a universal stapler for end-to-end and end-to-side angiorrhaphy and neurorrhaphy; a single-stage bronchial stump stapler; Bakulev's apparatus for suturing the cardiac auricle; the ULAV; a scaled-down version of ULAV for lobectomy; a stapler for simultaneous bronchial angiorrhaphy; a stapler for two-row gastric stump suturing; an experimental enterorrhaphic instrument; a single-staple apparatus and other devices for suturing the ureters and bile ducts and for deep ligation of blood vessels.

113. ANAN'EV M G, ANTOSHIN N V: IV nauchnaia sessiia NII EKhAiI [Fourth scientific conference of the Scientific Research Institute of Experimental Surgical Apparatus and Instruments] Med Promyshl SSSR, 15(3):59-62, 1961.

Tantalum staplers were the principal subject of the conference.

114. ANAN'EV M G, ANTOSHIN N V, GRITSMAN IU IA: Apparaty dlia ushivaniia tkanei tantalovymi skrepkami [Instruments for suturing tissues with tantalum staples] Eksp Khir, 2(1):28-35, 1957. Illus.

A survey of the development of tantalum stapling with a detailed description of the following instruments: the angiorrhaphic apparatus, the AI-625, the apparatus for end-to-side angiorrhaphy, the UKB, the one-staple apparatus for suturing soft tissues, the apparatus for ligating blood vessels, and the apparatus for suturing the gastric stump.

115. ANAN'EV M G, BABKIN S I, GRITSMAN IU IA: Nekotorye dannye o sostoianii tekhnicheskogo osnashcheniia khirurgii i osnovnye zadachi po ego uluchsheniiu [Certain data on the current status of the supply of surgical instruments and basic problems of its improvement] Nov Khir Appar, No. 3:10-9, 1959.

In spite of its outstanding success, the program of the Scientific Research Institute of Experimental Surgical Apparatus and Instruments for the development of new surgical instruments is marred by some shortcomings -- the most serious of which is the high rate of breakdown. These breakdowns, occurring in 15 per cent of the new instruments, are responsible for diverting funds and resources from research and development to replacement and repairs thus hampering the program. An organizational plan which should correct the shortcomings is outlined.

116. ANAN'EV M G, GESELEVICH A M: Ob eksperimental'nykh obosnovaniiakh pri sozdanii novykh khirurgicheskikh apparatov i instrumentov [On experimental principles for the construction of surgical apparatus and instruments] Khirurgiia, 32, (3):62-8, 1956.

A survey of the technical, physiological and histological aspects of experimental tantalum stapling of various tissues and organs is presented.

117. *ANAN'EV M G, GRITSMAN IU IA: Primenenie tantala v khirurgii [Use of tantalum in surgery] Nov Khir Appar, No. 2:7-12, 1958.

Two to four days after its introduction, tantalum is surrounded by infiltrates composed of lymphoid cells and segmented leukocytes. These infiltrates are later replaced by capsules containing fibroblasts, fibrocytes and connective tissue. The degree of reaction usually depends on the amount of graphitte on the surface of the staples. In a series of 200 experiments with tantalum stapling there were no complications. No

reflex changes were observed after gastric stump suturing. Since the development of the original stapler, a number of new devices have been introduced. The apparatus for side-to-side and end-to-side angiorrhaphy, the UKB, the ULAV, the apparatus for suturing the radix pulmonis, the apparatus for ligating difficult-to-reach blod vessels, and the apparatus for suturing the gastric stump are among the principal instruments developed recently.

118. **BABKIN S I: Osnovyne tekhnicheskie predposylki i sovremennye puti resheniia zadach po sozdaniiu sshivaiushchikh khirurgicheskikh apparatov [Basic technical premises and current methods for the solution of problems connected with the production of surgical suturing apparatus] Nov Khir Appar, No. 1:15-20, 1957.

See next article for abstract.

119. BABKIN S I: Osnovnye tekhnicheskie predposylki k sozdaniiu sshivaiushchikh khirurgicheskikh apparatov [Basic technical premises in the production of surgical suturing apparatus] Med Promyshl SSSR, 11(3):10-3, 1957.

Mechanical suturing instruments should be easy to operate, light, simple, non-traumatic, fool-proof and adaptable for mass production. Tantalum staplers, regardless of their purpose, consist of a support, a tissue holder and a stapling mechanism. Staplers developed by the Scientific Research Institute of Experimental Surgical Apparatus and Instruments are capable of producing single-staple, paired, circular, lineal one-row, two-row and notched sutures.

120. BOGOMOLOVA O R, LEBEDEVA N S, SAVCHENKO E D, KRIUCHKOVA G S: K voprosu o reaktsii tkanei na tantal [On the problem of tissue reactions to tantalum] Khirurgiia, 32(3):69-72, 1956.

The effects of tantalum on the tissue were investigated in a series of experiments performed on bronchi, nerves, intestines, stomach and tendons. Two to four days after the insertion of tantalum staples the opening is surrounded by a circumscribed infiltrate containing a con-

centration of lymphoid cells and occasional leukocytes. In about 10-15 days the infiltrate is replaced by a capsule composed of fibroblasts, fibrocytes and connective tissue. Granules of black pigment found at the edge of the opening were identified as graphite. Final results of the experiment demonstrate that tantalum is less reactogenic than other suture material, such as catgut or silk.

121. BOLKHOVITINOVA E N, SHAKHMATOV V G: Primenenie metallov v khirurgii [Use of metals in surgery] Med Promyshl SSSR , 15(6):7-11, 1961.

Utilization of tantalum and 1KH18N9 and K40NKHM alloys in surgical stapling is also discussed.

122. BOLKHOVITINOVA E N, VOLKOV A M: Issledovanie nekotorykh materialov dlia mekhanicheskogo shva [Investigation on certain materials for mechanical suturing] Med Promyshl SSSR, 11(2):41-5, 1957.

The 1KH8N9T, an alloy of carbon, silicon, manganese, titanium, nickel and chromium was investigated as a possible substitute for tantalum. In a tempered state the alloy possesses qualities similar to tantalum but without tempering it is not unsuitable as a suturing material. Tissue reactions to implanted 1KH8N9T and tantalum are similar.

123. BOLKHOVITINOVA E N, VOLKOV A M: Legkie splavy dlia detalei khirurgicheskikh apparatov [Light alloys for surgical instrument parts] Med Promyshl SSSR, 14(12):31-4, 1960.

The UKZH-7 with a frame made of titanium and a stapling machanism made of the 3KH13 steel alloy, and the UKL-60 with a frame made of various aluminum alloys and a stapling mechanism made also of the 3KH13, met all the requirements for surgical staplers.

124. BOLKHOVITINOVA E N, VOLKOV A M, PETROVA N P: Primenenie izdeli iz splava K40NKHM v khirurgii [Use of articles made of the K40NKHM alloy in surgery] Med Promyshl SSSR, 12(6):9-12, 1958.

K40NKHM, an alloy of carbon, molybdenum, manganese, chromium, nickel, titanium, aluminum, beryllium and cobalt, w as used as a stapling material in suturing nerves, blod vessels and ribs. Postoperative histological studiees failed to reveal any distinction in tissue reactions to K40NKHM and tantalum staples. Dental use of this alloy was also satisfactory.

125. *BOLKHOVITINOVA E N, VOLKOV A M, PETROVA N P: Primenenie splava K40NKHM v khirurgii [Use of the K40NKHM alloy in surgery] Nov Khir Appar, No. 2:107-10, 1958.

K40NKHM alloy was tested as a possible suturing material. There was no difference between tissue reactions to K40NKHM and tantalum implants, but K40NKHM was found to be less harmful than the 1KH18N9T stainless steel alloy which occasionally causes osteomalacia. The new alloy is especially promising in dentistry and in types of angiorrhaphy requiring strong sutures.

126. DVORIAKOVSKII V A: Sostoianie proizvodstva novoi khirurgicheskoi tekhniki [Current status of the industrial production of surgical instruments] Nov Khir Appar, No. 3:5-9, 1959.

In 1956 there were some 88 new surgical instruments, including staplers, developed in the Soviet Union. In 1957 this number was increased to 126. The output of angiorrhaphic and neurorrhaphic instruments reached 369 in 1959 and about 4,500-5,000 instruments should be produced during 1959-65.

127. GESELEVICH A M: Razvitie instrumental'noi tekhniki i operativnye metody [Development of instrumental technics and surgical methods] Nov Khir Appar, No. 3:20-9, 1959.

Among other instruments developed and used clinically in the Soviet Union are the UKB-16, the UKB-25, the UKL-60, the ULAV-10, the ULAV-5 and the UUS-23. The introduction of gastric and intestinal staplers should revolutionize surgery of the digestive system by making it accessible to a large number of surgeons.

128. GESELEVICH A M, GORKIN N S: Novye khirurgicheskie instrumenty i apparaty dlia grudnoi khirurgii [New surgical instruments and apparatus for thoracic surgery] Moscow, Medgiz, 1961.

Not seen.

129. KREITSER A G: Spravochnik po meditsinskoi apparature i tekhnike [A handbook on medical apparatus and technics] Moscow, 1961.

Not seen.

130. KUPRIIANOV P A, GRIGOR'EV M S, KOLESOV A P: Operatsii na organakh grudi [Operations on thoracic organs] Leningrad, Medgiz, 1960. 288 p. Illus.

Surgical staplers are also discussed.

131. LEIPTSIGSKAIA Iarmarka [The Leipzig Trade Fair] Med Rabot, No. 18:4, 1960.

Some 20 different types of staplers for suturing the blood vessels, intestines, soft tissues, radix pulmonis, bronchial stump, cardiac auricle and gastric stump were exhibited.

132. MEDITSINSKIE pribory i apparaty, vypuskaemye nashei promyshlennost'iu [Medical equipment and apparatus issued by our industry] Nov Med Tekhn, No. 1:87-112, 1960. Illus.

The list includes photographs and brief descriptions of the following instruments: the universal angio-neurorrhaphic apparatus, the UUS-23, the UKL-60, the UKL-40, the UKZH-7, the enterorrhaphic apparatus, the multi-staple apparatus for deep ligation of blood vessels, and various one-staple devices for suturing soft tissues, including the Apparatus 0.15, the Apparatus 0.25 and the Apparatus 0.4.

133. O PRISLUZHDENI diplomov, nagrazhdenii medaliami i tsennymi podarkami Vsesoiuznoi promyshlennoi vystavki [Awarding of diplomas, rewards and valuable gifts at the All-Union Industrial Exhibition] Med Promyshl SSSR, 14(8):63-5, 1960.

Soviet scientists who participated in the development of surgical staplers were among the recipients of various awards.

134. SOVIET surgical stapler being tested here. Scope 5(5):1; 7, 1960.

Surgical staplers obtained by American physicians in the Soviet Union were used in cardiovascular and pulmonary surgery in the Baltimore City Hospital, the Maimonides Hospital in Brooklyn and in the Sloan-Kettering Institute for Cancer Research saving as much as ten minutes in open heart surgery and fifteen minutes in bronchial stump suture. Possible use of the apparatus in managing the mesenteric vein in inoperable cases of pancreatic cancer is also considered.

135. U.S.S.R. staplers for surgical use begin U.S. tour. Med Tribune, p. 20, July 25, 1961.

A nation-wide tour to introduce and sell Soviet-built surgical staplers in the United States began with a demonstration at the George Washington University Hospital and a film at the Soviet Embassy. Included in the exhibit were staplers for suturing blood vessels, nerves, dura mater, sternum, ribs, bronchial stump, lung hilum, arterial duct and gastrointestinal organs.

136. VYRZHIKOVSKAIA M F: Rentgenologicheskii metod kontrolia pri ispytanii khirurgicheskikh sshivaiushchikh apparatov [A roentgenological method of control in the investigation of surgical suturing apparatus] Nov Khir Appar, No. 2:54-7, 1958.

A method for the x-ray investigation of the anatomical and functional aspects of tantalum stapling in experimental animals is described.

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